Minor Programme for All Branches

Theme: Chemistry for Engineering Application

Course Code: CYOM1306/ CYOM1406/ CYOM1506/ CYOM1606	Sustainability & Modern Chemical Technology	Credits:04 (L:T:P:3:1:0)

Prerequisites: -

Course Outcome

COs	Outcomes
CO1	Enabling the students to learn about role of chemistry in fostering sustainable development.
CO2	Introducing the students to fine chemicals and their synthesis at the industrial level.
CO3	Developing an understanding in the students about the concept and role of catalysis in the synthesis of fine chemicals.
CO4	Enabling the students to learn about the various types of catalysis (homogeneous and heterogeneous catalysis; bio-catalysis, enantio-selective catalysis, phase transfer catalysis).
CO5	Enabling the students to learn about energy and its biological resources (bio-fuels).
CO6	Enabling the students to learn about harvesting energy from biochemical resources.

Module	Content	Lectures
1.	Role of chemistry in addressing current challenges for sustainable development: pollution, energy and water resources management	6
2.	Fine chemicals and their synthesis: bio-catalysis, enantio-selective catalysis.	6
3.	Catalysis in fine chemicals: mechanism of catalysis, homogeneous and heterogeneous catalysis; catalyst performance, phase transfer catalysis.	6
4.	Energy and its biological resources; Bio-Fuels: Biofuel feedstocks: sugar, starch, lignocelluolosic, plant and animal fats feedstock; Market and product process of bioethanol; Raw materials to produce low cost bio-diesel	6
5.	Harvesting energy from biochemical resources.	6

Texts Books:

1. A. Cybulski, J. A. Moulijn, M. M. Sharma, and R. A. Sheldon, *Fine Chemicals Manufacturing and Engineering* , Elsevier Science, 2001.
2. C. M. Drapcho, N. P. Nhuan and T. H. Walker, *Biofuels Engineering and Process Technology*, McGraw Hill, 2008.

References:

1. P. Pollak, *Fine Chemicals: The industry and the Business,* John Wiley and Sons, 2007.
2. A. Nag, *Biofuels refining and performance,* McGraw Hill, 2008.
3. D. M. Mousdale, *Biofuels: Biotechnology, Chemistry and Sustainable Development* CRC Press, 2008
4. R. N. Shreve and J. A. Brink, *Chemical Process Industries*, 4th Ed., International Students Edition, 1977.
5. G. F. Austin, *Shreve's Chemical Process Industries*, 5th Ed., McGraw Hill Pub., 1984.